Biological Materials Sampling

Collecting Samples of

Suspected WMD Biological Agents

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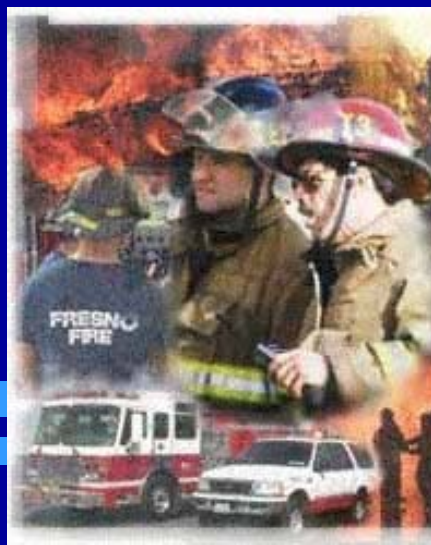

Workshop Overview

Reviewing the basics

- Answer the who, what, where...

Collecting biological samples

- Tools and techniques that differ from other HazMat sampling

Demonstrating procedures

The Basics of Biological Sampling

What's so different about collecting biological samples?

Why Collect Biological Samples?

Classify incident as hoax or naturally occurring event

Need special detection procedures

- Cannot detect in the Hot Zone
- Differentiate incident from background

Preserve as evidence

Evacuate to laboratory

When Might You Have to??

1) Possible emergency response scenarios

- "Anthrax hoax" letter
- Biomedical HazMat incident: site evaluation
- Everyday emergency response: indicators biological terrorism

Indicators of Bioterrorism
(a quick review)

Immediate indicators

- Warning or threat (before)
- Find a dissemination device
- Observe intentional dissemination
- Credit taken (after)
- Unknown released material
  - Doesn't belong there
  - No immediate effects
  - Powder, spray, mist, liquids
  - Stains on surfaces, plants, or soil

- Medical indicators
  - Unusually large epidemic
  - Unusual disease or strain of disease for area
  - Multiple or simultaneous release points
  - Multiple diseases
  - Discrete pattern or population of victims
  - Victims more severely affected than normal
  - Unusual route of entry

More Opportunities to Collect Biological Samples

2) Possible medical support scenarios
   - Survey site of previous outbreak
   - Recover contaminated item
   - Evaluate site restoration
3) Preparing for emergencies
   - High risk area surveys
   - Training

Where to Look? (I)

Depends on the scenario

What is the suspected material?

Signs of release

- Liquid droplets, puddles
- Powders or dust
- Discolored, wilted plants
- Changes in soil color

What to Look For?

What is the suspected material?

Environmental vs. clinical/animal samples

Contained or released?

Concentrated or diluted?

Solid, liquid, air, other?

Aerosol vs. deposited materials

How Many Samples to Get?

Collect background and “hot” samples

The background sample(s)

- Background vs. trip blanks vs. field blanks
- Why collect the background?
- How close should it be (to the incident)?
- How many to collect?
- Who collects the background samples? When?

The “hot” samples

- Multiple sets of samples

How to Do It?

Protect yourself first

Similar techniques for collecting chemical samples

Focus on the differences

- Tools used to get it
- What to do, and
- What not to do

Collecting Biological Samples

A few tools and techniques

Types of Sample Collection Equipment

- Air sampling equipment
  - Impactor
  - Impinger
  - Dry filtration
- Solid/liquid sample kits
  - Various collection tools
  - Containers suited to the items collected

Where to Look (II)

Outside release

- Wind direction, terrain
- Ground, surfaces, sheltered locations

Inside release

- HVAC, closed vs. open rooms

Devices or containers

Where to Look (III)

Clandestine bio production facility

- Cold storage - seed stock, live material
- Reaction vessels
- Handling equipment
- Dissemination device filling
- Testing equipment, test animals
- HVAC ducts, hood
- Waste stream, receptacles
- (Presence of medical PPE, decontaminants, sterilization)

Before You Enter

Pre-entry briefing

Evaluate multiple risks

Select your tools

- Include normal evidence collection tools

Prepare your sampling kits

Collecting the Sample
(what to do)

Document the process

- Photo or video
- Read operating instructions
- Field log
- Chain of custody

Collect one sample at a time

Collect sufficient material

- Diluted by the environment?

Some Bio Sampling Tips

Use a “clean spot”

Two-person process

Multiple sets of gloves

Minimize contact with clean items

Use collection tool once and discard

Collecting the Sample
(what not to do)

- Missed items
- Trash - collecting and adding
- Contaminating the sample
  - Environmental contamination
  - Cross contamination
- Opening sterile seals too soon
- Dangers to team

Sample Handling

Safety of handlers

- Evaluate risks
- Triple containment
- Packaged for transportation
- What to decontaminate

Preservation of the sample

Sample Preservation

Properly sealed

Keep it alive

- Protected from decontaminants
- Shielded from UV light
- Cold storage
- Deliver to lab quickly

Collection fluids

- Wet vs. dry agents
- Buffered solutions

Practical Example

A demonstration of collecting biological samples

Bio Sample Collection Kits

Self-contained, individually sealed kits

Components sterile and clean

Types of kits vary for types of collection

- **Large surface area swipe kit** - accessible locations with powders, deposited aerosols
- **Small area kit** - bulk solid materials, gel, slurry, less accessible locations
- **Liquid kit** - liquid material and water

Familiarization with Sample Kit Components

Tools for collecting the sample

- Individually packaged tools
- Collection fluid

Inner container

- Sterile Whirl-Pak bag or collection tube

Outer container

- Zip-lock bag

Preparation of Sample Kits

Select the kits to use

- Right kit for the job
- Enough kits for all of the samples

Open and check the kits

- Don’t open sterile seals
- Do examine and label items

Using a Large Area Swipe Kit

How big an area - depends on situation

Step-by-step instructions

- Open Whirl-Pak bag
- Add collection fluid
- Collect the sample
- Return sponge to bag, close
- Place into outer bag

Collecting a Solid Sample

- Options
  - Wet or dry
  - Swab or scoop
- Step-by-step instructions
  - Open/remove swab/scoop
    - (Option to wet swab)
  - Collect sample
  - Deposit into tube
    - (Option to add collection fluid)
  - Place into outer bag

Collecting a Liquid Sample

How much liquid depends on availability, access

Step-by-step instructions

- Open Whirl-Pak bag
- Open/remove syringe
- Collect sample
- Place into bag, close
- Place into outer bag

Transferring the Samples

- Transfer at the Hot Line
  - Overpack bag, tie, and seal
  - Chain of custody form
- Final configuration for transport
  - Decontaminate overpack
  - Transport package
    - Class 6.2, combination package, PG I
    - Watertight container, absorbent material
  - Disposition of forms

Conclusions

Biological sampling is different from other HazMat sampling

- Some tools are unique
- Some techniques are different
- Background sampling required

Many similarities to other evidence collection techniques